

Claims

What is claimed is:

1. A method comprising step of:
 - (a) moving a sensor in a nominally longitudinal direction relative to a
5 frame of reference; and
 - (b) guiding the sensor substantially based on a parametric model that defines both (1) a generally lateral position scale affixed to the frame of reference and (2) a first curved parametric profile defined relative to the position scale and having a contiguous concavity range wider than the
10 sensor.
2. The method of claim 1 in which the guiding step (b) comprises steps of:
 - (b1) using the model to generate a modeled position-indicative value; and
 - (b2) transmitting a first output value if the modeled position-indicative
15 value equals a measured position-indicative value, and otherwise generally not transmitting the first output value.
3. The method of claim 1 in which the guiding step (b) comprises steps of:
 - (b1) measuring a parameter of interest at many (N) positions across the
20 position scale; and
 - (b2) estimating a curved parametric profile value between two successive ones of the N positions without any lateral linear interpolation.

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4. The method of claim 1 in which the guiding step (b) comprises steps of:
- (b1) measuring a parameter of interest at many (N) positions across the position scale so as to express a preliminary profile of many measurements each having a preliminary measurement error; and
- 5 (b2) defining the curved parametric profile so as to define a model having reduced measurement errors at most of the N positions.
5. The method of claim 1 in which the guiding step (b) comprises steps of:
- (b1) measuring a parameter of interest at many (N) positions across the position scale so as to generate at least N measurements; and
- 10 (b2) expressing the curved parametric profile as a function based on the position scale and fewer than $N/2$ scalar coefficients, the scalar coefficients at least partially based on the measurements.
- 15 6. The method of claim 1, in which the guiding step (b) includes a step (b1) of interpolating between the first curved parametric profile and a second curved parametric profile to obtain a longitudinally interpolated value.

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7. A device comprising:
at least one sensor able to move in a nominally longitudinal direction
relative to a predetermined frame of reference; and
a servo controller constructed and arranged to guide the sensor(s)
5 substantially based on a parametric model that defines both (1) a
generally lateral position scale affixed to the frame of reference and (2)
a first curved parametric profile defined relative to the position scale
and having a contiguous concavity range wider than the sensor(s).
- 10 8. The device of claim 7 in which the generally lateral position scale is not
merely translational.
9. The device of claim 7 in which the parametric model further includes
many additional parametric profiles distributed across a longitudinal
15 range, the parametric model essentially consisting of a table of
coefficients smaller than 2 kilobytes for each of the sensor(s).
10. The device of claim 7 in which the parametric model models a lateral
position offset, and in which the curved parametric profile includes at
20 least one additional concavity range.